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## **BONGA DEEPWATER PROJECT, NIGER DELTA, NIGERIA**

Bonga is the first deepwater project for the Shell Nigeria Exploration and Production Company Limited (SNEPCO) and for Nigeria as a country. The discovery well is located in Oil Prospecting License (OPL) 212, which was awarded during Nigeria's first round of deepwater frontier acreage awards in 1993. SNEPCO operates the field on behalf of the Nigerian National Petroleum Corporation (NNPC) under a production sharing contract, in partnership with Esso (20%), Nigeria Agip (12.5%) and Elf Petroleum Nigeria Limited (12.5%).

### **EXPLORATION**

Bonga lies 120km south-west of the Niger Delta, in water more than 1,000m deep. The areal extent of the Bonga field is some 60km<sup>2</sup>. After acquiring and processing 3D seismic in 1993/94, the first Bonga discovery well was drilled between September 1995 and January 1996. Recoverable reserves have been put at 600 million barrels (bbl) of oil.

In May 2001, Shell drilled an exploration well on Bonga South-West (Bonga SW) located some 10km south-west of the Bonga Field. Bonga SW was drilled in a water depth of 1,245m. The well reached its final depth of 4,160m and was subsequently logged and suspended. It encountered a substantial amount of net oil sand.

An initial evaluation of the well results indicates that the recoverable reserves discovered with Bonga SW could be large enough to form the basis for a new deepwater development in OML118.

### **FPSO**

Shell decided on an FPSO development solution. AMEC secured the £300 million offshore contract for the engineering design, fabrication, integration and commissioning of the 17,000t topside production facilities. These were necessary to produce around 200,000bbl of oil and 150 million scf of natural gas per day. The newly built hull will arrive in the UK in the third quarter of 2002, following its construction in the Far East under a separate contract. The topsides will be installed onto the hull to create the 300,000t FPSO.

ABB won the US\$180 million order for the engineering, procurement and construction (EPC) of all of the subsea equipment. This will include production-control umbilicals and gas-lift risers.

As part of the contract, ABB will supply 29 conventional subsea trees and associated hardware, to facilitate oil production from, and water injection into, the reservoir. Equipment delivery will continue until mid 2009. The workscope encompasses project management, engineering and the supply of manifolds, trees, wellheads, controls, connection systems, intervention equipment, integration testing and installation support.

Meanwhile, Stolt Offshore has signed an agreement for a turnkey subsea construction contract. Valued at about US\$200 million, this contract covers design engineering, procurement, installation and commissioning of the gas-export pipeline, production flowlines, water-injection lines and steel catenary risers. Stolt Offshore will commence design engineering and procurement work immediately. The risers will be fabricated in the second half of 2002 at the Stolt Offshore Nigerdock pipe reeling facility, in Nigeria. The offshore installation is targeted for 2003.

The installation workscope includes rigid steel flowlines, together with steel catenary oil- and gas-production

risers. The Seaway Polaris will install 36km of 10in-diameter production flowlines and all the project's steel catenary risers using the 'J Lay' method. Additionally the Seaway Polaris will handle the installation of the 92km-long 16in-diameter gas-export pipeline from the Bonga FPSO, to the Shell EA Riser Platform. The Seaway Kestrel will install 25km of 12in-diameter water-injection flowlines. Survey and tie-in work will be undertaken by the Seaway Legend.

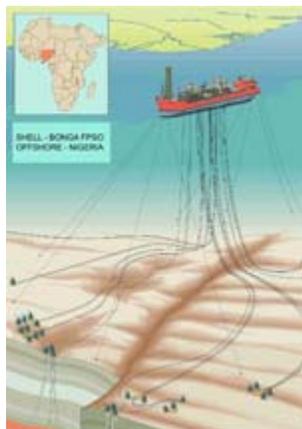
## **GAS AND OIL EXPORT**

Gas from the Bonga will be piped to the Nigeria Liquefied Natural Gas (NLNG) plant at Bonny, where a third processing train is to be constructed. LNG will be exported to Atlantic and European markets. The oil will be exported via tankers. Prior to direct offloading, the oil will be stored on-board the production facilities.

The full field development, subject to the approval of the contracts by all partners, will cost some US\$2.7 billion.



**The position of the Bonga, within the Niger Delta blocks.**



**The layout schematic of the Bonga.**

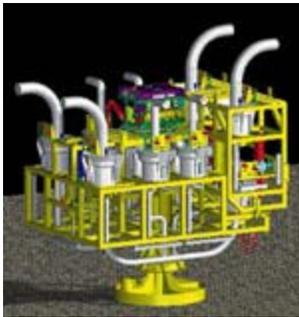


**The Seaway Legend, which will carry out survey and tie-in work.**

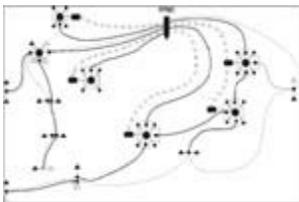
**ABB will provide 29 subsea christmas trees.**



**ABB will supply 29 jumper connections, in its largest subsea order to date.**



**The subsea facilities layout.**



**Shell decided on an FPSO development solution.**



**Bonga FPSO in Korea.**



**Bonga FPSO arriving on the Tyne.**



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